ABSTRACT

An improved system and method for estimating one or more parameters, such as amplitude and signal-to-noise ratio, of a received signal, such as an M-QAM or q-ASK signal, is set forth herein. The ~~A first embodiment of the invention estimates the~~ amplitude of an M-QAM signal is estimated based upon known or ascertainable phase information regarding a plurality of transmitted symbols. The amplitude of a q-ASK signal is estimated based upon known or ascertainable magnitude information regarding a plurality of transmitted symbols. In another embodiment, the amplitude of an M-QAM or q-ASK signal is estimated based on statistical knowledge of the amplitude of the transmitted symbols. ~~A respective set of received symbols corresponding to the plurality of transmitted symbols is recovered. Each of the plurality of received symbols is multiplied by a complex unit vector with a phase that is opposite in sign to the complex transmitted data symbol to generate a set of products. The set of products is summed, and the real part of the sum of products is then determined. The absolute values of the known transmitted symbols are summed to generate a total magnitude value. The real part of the sum of products is divided by the sum of transmitted magnitude values to generate an estimate of the amplitude of the M-QAM signal.~~ Other embodiments of the present invention estimate amplitude, noise power, and signal-to-noise ratio of a received signal utilizing ~~utilize~~ second-order and fourth-order moments of received samples, a maximum likelihood searching process, or a Kurtosis estimation process ~~to estimate amplitude, noise power, and signal-to-noise ratio of a received signal~~.